

The Canadian Entomologist.

VOL. XLV.

LONDON, JANUARY, 1913

No. 1

NOTES ON AMERICAN HEMIPTERA.

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II.

(Continued from Vol. XXXVIII, 1906, p. 202).

ARADIDÆ

1. *Aradus aequalis* Say.—Mr. Heidemann has sent me a specimen of *A. duryi* Osb., communicated to him by Mr. Dury. I quite agree with Heidemann in considering this species a synonym of *aequalis*.

2. *Aradus montanus*, n. sp.—Ovate (♀), finely granulated, uniformly dark brownish black including legs and antennæ. Head somewhat longer than broad and as long as the pronotum in the middle, with two parallel longitudinal impressions, the tubercle near the anterior angle of the eyes low and obtuse, antenniferous spines a little divergent, not quite reaching the middle of the first antennal joint and with a small tooth on their outer margin, rostrum reaching the anterior coxæ, antennæ moderately robust, a little more than half as long again as the head, second joint $2\frac{1}{2}$ times longer than first and a little longer than half the breadth of the head (including eyes), a little thicker at apex than at base, third and fourth joints taken together scarcely longer than second, third joint a little thicker than second, fourth conspicuously narrower and shorter than third. Pronotum kidney-shaped but with a short lobelet anteriorly on each side near the neck of the head, a little narrower than the hemelytra between their dilated sub-basal part and a little more than twice broader than long in the middle, its greatest width in the middle where the lateral margins are rather broadly rounded and from where they are strongly convergent toward the apex, much less so toward the base, the whole lateral margins distinctly crenate, the four median discal ridges subequally distant at their base, the inner pair reaching the anterior margin, thicker and more approximated before the middle, the outer pair not reaching the apical margin. Scutellum a little longer than the pronotum in the middle, with a blunt median longitudinal keel in the basal half, the lateral margins convergent from the base to beyond the middle, then slightly rounded to the apex. Hemelytra (♀) slightly passing the base of the dorsal genital segment, exocorium moderately dilated and reflected in

its basal part, mesocorium with a single oblique transverse ridge behind the middle, endocorium without distinct transverse ridges, membrane scarcely reticulate. Abdomen (♀) one-third broader than the pronotum, with the apical angles of the segments very slightly obtusely prominent, those of the fifth segment more distinctly so and those of the sixth segment strongly prominent owing to the lateral margin being deeply arcuately indented between the apex of this segment and the base of the genital lobes; sixth ventral segment in the middle scarcely longer than the fifth and than the two genital segments combined, its apical angles reaching the transverse level of the apex of the second genital segment which is half the length of the first, apical margin of dorsal genital segment notched in the middle, genital lobes convergent, approximated interiorly, their inner margin strongly rounded, the outer margin slightly rounded with a short tooth-like process in the basal half. Length, ♀ 8 mm.

Colorado (Leadville, 10,000—11,000 ft.: H.F. Wickham).—Coll. Schouteden. A plain-looking species, but not closely allied to any described North American form.

3. *Aradus curticolis*, n. sp.—Broadly ovate (♂), finely and thickly granulated, jet-black, membrane brown, third antennal joint of dirty whitish color, anterior and intermediate tibiae paler in the middle. Head a little longer than broad, vertex with two longitudinal impressions which are slightly divergent forwards, eyes very prominent, substylated and directed a little upwards, intra-ocular tubercle scarcely perceptible, antenniferous spines slightly divergent, reaching beyond the middle of the first antennal joint, without a tooth on their outer margin, rostrum reaching fore coxae, antennae almost fusiform, incrassated in the middle and equally tapering toward base and apex, as long as head and pronotum together, first joint rather narrower, second joint as long as the breadth of the head (with the eyes) and considerably longer than the last two joints combined, cylindrically incrassate from apex to beyond middle, then moderately narrowed toward base, third joint cylindrical, narrower than apex of second and not much more than one-third its length, suddenly narrowed at base, fourth joint narrower and conspicuously shorter than third. Pronotum with entire, not crenulated lateral margins, distinctly shorter than head and three times broader than long, a little narrower than the hemelytra between their dilated subbasal part, its greatest width before the middle from which point the lateral margins are very strongly convergent to the apical angles and moderately roundedly convergent toward the base, the two median ridges parallel, reaching apical margin, the following pair at the base more distant from the median ridges than these from each other, a little convergent anteriorly, not reaching anterior margin,

ending in a flattened tubercle, the outermost (humeral) ridges very short, nodiform. Scutellum three-fourths longer than pronotum in the middle, with a transverse tubercle before the middle, lateral margins broadly and slightly rounded. Hemelytra (♂) reaching the apical lobes of the abdomen, roundedly dilated and reflected near base, exocorium and endocorium with some transverse ridges, mesocorium with a single oblique transverse ridge behind the middle. Abdomen three times broader than the membrane, apical angles of fifth segment very slightly obtusely prominent, male genital lobes obliquely slightly rounded at apex, meeting interiorly. Length, ♂ 5.8 mm.

North Carolina (Southern Pines: A. H. Manse).—Coll. de la Torre Bueno. A very distinct species, somewhat allied to the quite differently coloured *A. behrensi* Bergr., but more broadly ovate with longer and less incrassate antennæ and much shorter pronotum having the two median keels much more approximate at base. I have not seen the female, but the abdomen is probably not or not much broader in this sex. *A. cincticornis* Bergr. and *curticollis* Bergr. belong to the very few *Aradus* species having the abdomen broadly ovate also in the male.

4. *Aradus cincticornis* Bergr.—This species stands in some collections under the unpublished name *A. nasutus* Uhl.

5. *Aradus tuberculifer* Kirby.—Black, sometimes tinged with greyish brown, apical margin of connexival segments yellowish, corium with a dark luteous costal patch before the middle, this patch being sometimes diffused over a large part of the corium, legs fuscous black. Head distinctly longer than broad with a U-shaped impression above, intraocular tubercle distinct, antenniferous spines a little divergent with a small tooth, sometimes indistinct or wanting, on the outer margin, rostrum reaching or slightly passing the anterior margin of the mesosternum, second joint of antennæ a little shorter than the head, almost linear from the base to the middle, then strongly and rather suddenly clavately incrassate, third joint a little shorter than half the length of the second joint, incrassate, even thicker than the apex of the second joint, parallel-sided except at the constricted base, fourth joint distinctly shorter and a little thinner than the third. Pronotum two and one-half times broader than long in the middle, lateral margins very finely crenulate or almost smooth, antero-lateral margins slightly sinuate, the four median discal keels parallel, the inner ones approximated in their anterior half, the outer ones abbreviated before the middle; the greatest width of the pronotum is immediately behind the middle, from which point the lateral margins are very distinctly convergent towards the base. Scutellum subtriangular, a little longer than the pronotum in the middle, with a blunt median tubercle. Hemelytra (♀) passing the base of

the dorsal genital segment, costal margin of corium moderately amplified toward the base, veins of membrane narrowly bordered with white. Female dorsal genital segment triangularly narrowing toward the apex, leaving the apical lobes free and separated from them by a fine suture. Discal lobes of the sixth female ventral segment distinctly longer than those of the fifth segment, either lobe considerably longer than broad, rounded at apex, taken together broader than long, first ventral genital segment about half the length of the sixth ventral segment, the apical lobes convergent, rounded at the external margin and at the apex, almost twice longer than broad. Length, ♀ 7.3 mm.

A. tuberculifer Kirby in Richardson, Fauna Bor. Amer. IV., 278, pl. VI., fig. 5 (1837).

A. caliginosus Walk., Cat. Hem. Het. Brit. Mus. VII., 36 (1873).

This is a Boreal species which has hitherto been recorded only from Canada and even there it seems to be rare. From the United States I have seen but one specimen, taken in Colorado (probably in the high mountains) by Morrison, and the species has apparently remained unknown to Uhler and Heidemann. It is closely allied to but specifically distinct from the Palearctic *A. crenaticollis* F. Sahlb.

6. *Aradus funestus*, n. sp.—Black, apical margin or at least apical angle of connexival segments yellowish, corium with a more or less distinct yellow costal spot before the middle. Antennae thin, second and third joints slightly and gradually incrassated from the base to the apex, third joint about one-third the length of the second, fourth joint equal to third in length and thickness. Pronotum twice broader than long in the middle, the lateral margins parallel from the middle to the base. Scutellum pentagonal, as long as the pronotum in the middle, the lateral margins parallel from the base to the middle. Hemelytra reaching the apex of the dorsal genital segment, costal margin of corium scarcely (♂) or slightly (♀) amplified toward the base. Female dorsal genital segment dilated toward the very broad apex, laterally covering the basal part of the apical lobes, reaching almost to their outer margin, its apical margin broadly rounded. Apical lobes of the genital segment seen from the ventral side at least twice longer than broad. Other characters as in *A. tuberculifer*. Length, ♂ 57 mm., ♀ 7–7.5 mm.

This species is common in Canada as well as in the Northern U. S. from the Atlantic to the Pacific ocean, and I have also seen a specimen from Colorado. In the various writings of Prof. Uhler it is recorded under the name *tuberculifer* Kirby; and under this name it stands in most if not all American collections. Kirby's description fits both these species equally well. Fortunately he had

figured his species, clearly showing the structure of the antennæ. There can thus be no doubt as to which of the two species he had before him.

7. *Aradus lugubris* Fall.—In his Catalogue of the Heteroptera of the British Museum, Walker described as new an *Aradus fenestratus*, founding the species on many specimens from St. Martin's Falls, Albany River, Hudson's Bay, and from Nova Scotia, and on two specimens from the Rocky Mountains. In his Revision of Walker's Aradidæ Distant marked *fenestratus* as a good species, and in arranging the Aradids of that Museum Distant has apparently left the types of this species in the same state as Walker, as I stated when I examined them a year ago. The first specimen bears a round label with the word "type" upon it and belongs to *lugubris* to which also several other specimens appertain, but intermixed with them are a few specimens of *Aradus abbas* Bergr., easily recognized by the very slender antennæ narrowly biannulated with white. Walker's description exclusively refers to *lugubris*, of which *fenestratus* should be cited as a synonym.

Gen. *Calisius* Stal.

To the characters of this genus should be added: Metanotum et segmentum primum (verum) dorsale abdominis ad latera corporis visibilia. Orificia distincta, punctiformia, mox ante coxas posticas sita.

In all species of this genus the scutellum is constricted in the middle, but the margins appear to be straight owing to the linear corium being so closely attached to the scutellum that it seemingly forms a part of it. The connexivum in this genus is split from the lateral margin, being, as Champion correctly observed, "divided into two parts, a dorsal and ventral," but these are not always similarly armed, as will be seen from the descriptions given below. To get a correct view of the manner in which the connexivum is armed it is necessary to examine the upper lateral margin at a right angle to the margin (thus more or less horizontally, as the margin is more or less reflected) and the lower lateral margin obliquely from above, lest the tubercles of the ventral lateral margin will make the impression of being situated on the dorsal lateral margin.

8. *Calisius elegantulus*, n. sp.—Subelongately ovate (♀), light brownish testaceous, last antennal joint fuscous, scutellum with two transverse oblique black spots immediately behind the basal callosity at the median ridge and a cretaceous streak on each side between the black subbasal spot and the lateral sinuosity, the first connexival segment whitish testaceous, the three following segments infuscated, the three last segments with a whitish bloom and a small rectangular denudated fuscous spot before the middle. Head considerably longer than broad and longer than the

pronotum, granulated, with short longitudinal fuscous impression on either side within the eyes, antennae much shorter than the head, the first three joints subequal in length, third reaching apex of head, narrower than second, fourth joint incrassated, longer and thicker than second. Pronotum on the anterior lobe with two strongly convergent waved keels, each bearing a black tubercle, on the posterior lobe with four short ridges, each bearing a brown tubercle. Scutellum rather strongly and densely punctured with a series of three or four black granules immediately within the lateral sinuosity, apex unarmed, the basal elevation broadly crescent-shaped, three times broader than long, granulated and with two small broadly separated black tubercles at the very base, partly overlapping the pronotal basal margin; a short faint oblique ridge between each side of the basal elevation and the scutellar margin; the median scutellar keel slightly granulated, narrowing toward apex. Abdomen with the first connexival segment but slightly narrower exteriorly than interiorly, the posterior margin of this segment scarcely oblique, the upper lateral margin of the three following segments with two short apically subtruncate lobes, anterior lobe blackish, posterior brown, upper lateral margin of all subsequent segments with two tubercles, anterior tubercle black, posterior pale, the lower lateral margin of all segments (first excepted) with three tubercles, the middle one of which is black, the others being pale. Legs pale testaceous, a submedian ring to femora and tibia, apex of tibiae, and tarsi fuscous. Length, ♀ 3.7 mm.

Guadeloupe Island, West Indies; communicated by Mons. A. Montandon.

Alied to *C. pallidipes* Stal, but with differently constructed antennae and differently coloured scutellum and legs.

9. *Calisius contubernalis* n. sp.—Oblong (♀), fuscous-ochraceous, sometimes darker, last antennal joint fuscous, first connexival segment whitish ochraceous. Head a little longer than broad, granulated, the apical process with a lateral impression, antennae as long as the head, first joint slightly passing apex of antenniferous spines, second joint as long as first and almost reaching apex of head, third joint as thick as and a little longer than second, fourth joint thicker and somewhat longer than third, rostrum almost reaching base of head. Pronotum slightly shorter than the head, the posterior lobe finely and rather thickly punctured, with four keels, the two median ones parallel, the outer pair strongly convergent and continued over the anterior lobe where they are granulated, reaching the apical margin. Scutellum rather more strongly punctured than the posterior pronotal lobe, with a series of five black granules immediately within the lateral sinuosity and a transverse series of 8 or 9 such granules close to the apical margin, the median carina granulated, attenuated toward apex, at the base

forming a triangular elevation bearing three small tubercles (placed in a triangle) on each side and emitting a short oblique granulated ridge to the lateral margins. Sternum scarcely granulated. Abdomen with the first connexival segment forming a transverse triangle the apex of which reaches the lateral margin and the posterior margin of which is oblique; the upper lateral margin of all the following segments with two very short lobelets, anterior lobule brown, posterior pale, the lower lateral margin of all segments (first excepted) with three small tubercles, the median one blackish, the others pale; last dorsal segment in the male subquadrately elevated and granulated in the middle, dorsal male genital segment very short, transversely sublinear, venter scarcely granulated, fifth male segment arcuately sinuated in the middle almost to the base, sixth segment also deeply arcuately sinuate in the middle, yet scarcely shorter there than at the sides, first genital segment as long as sixth ventral segment, broadly sinuate at apex, the apical angles with a short upturned cylindrical process not reaching the apical angles of the last ventral segment, second genital segment shortly protruding beyond the dorsal genital segment, with two small teeth or granules at apex, on the underside divided into three lobes by two longitudinal impressions, the median lobe narrower than the somewhat tumid lateral lobes. Legs ochraceous, in dark specimens somewhat infuscated. Length, ♂ 3.7-3.8 mm.

St. George Island, Florida; Guadeloupe Island, W. T.

At once distinguished from *C. elegantulus*, apart from colour, by the structure of the antennæ, the sculpture of the scutellum, the form of the first connexival segment, etc. The structure of the antennæ and scutellum also separates it from *C. pallidipes*.

The male type from Florida, taken by Mr. Pergande, is in the Washington Museum; the female cotypes from Guadeloupe have been communicated by Dr. H. Schouteden.

10. *Calisius anaemus*, n. sp.—Closely allied to the preceding species, but entirely very pale ochraceous without darker markings and with all granules and tubercles as pale as the ground-colour. The very short first joint of antennæ reaching apex of antenniferous spines (remaining joints wanting). The two convergent keels of the anterior pronotal lobe connected at apex by a short transverse ridge. Scutellum close to apical margin without the transverse series of small tubercles, but the apical margin itself distinctly crenulated. Underside of body very finely and thickly granulated. First male genital segment a little shorter than sixth ventral segment, the apical margin a little sinuate in the middle. Second male genital segment with the median lobe very narrowly triangular. Length, ♂ 3.8 mm.

Biscayne, Florida.

This species was determined as *C. pallidipes* Stal by Uhler and was recorded under this name by Heidemann in Proc. Ent. Soc. Wash. VI., p. 229. The specimen is a ♂, not a ♀, as Heidemann says. Stal's species (from Rio Janeiro) is a darker, brown-speckled insect with differently sculptured pronotum and scutellum.

11. *Calisius major*, n. sp.—Oblong-ovate (♂), dark testaceous, scutellum (except basal elevation and median keel) whitish cinereous with a large median area and the apex sprinkled with fuscous and with an oblique black fascia on each side immediately behind the basal elevation, last dorsal segment and upper side of the protruding male apical genital segment blackish. Head slightly longer than broad, antennæ scarcely longer than the head, rather stout, first two joints short, second a little thicker and more oval than the first, third joint much the longest, thicker and more than three times longer than the second, attenuated at the base, fourth joint as thick as the third and more than twice longer than the second. Pronotum a little shorter than head, anterior lobe remotely granulated, posterior lobe with four keels, the two median keels convergent from base to apex, the outer keels almost parallel, slightly convergent apically, the lateral margins of the lobe also somewhat elevated. Scutellum superficially and concolorously punctate, the transversely triangular basal elevation at its base on each side with two short keels, the outer one of which is obliquely continued to the scutellar lateral margin, the median scutellar ridge scarcely granulated, attenuated toward apex, the lateral margins immediately within the sinuosity with a series of three black granules, the apical margin neither granulated nor crenulated. Abdomen with the lateral margins of all the seven connexival segments provided with two tubercles, the anterior black, the posterior pale and sometimes notched, last male dorsal segment transversely convex, its apical margin sinuate, the apical male genital segment protruding considerably beyond the extremely short dorsal genital segment. Legs pale testaceous. Length, ♂ 4 mm.

Venezuela (La Guayra); in my collection.

Readily distinguished from all other species by the structure of the antennæ and other characters. The specimen being strongly carded I am unable to describe the ventral genital segments.

12. *Proxius gypsatus* Bergr.—Of this species, described from Venezuela and also found in Panama and Guatemala, I have seen two specimens from Florida; one is without precise locality, the other from St. Augustine and bears the label *Syrtidea diffracta* Uhl., apparently an unpublished name. Two species of *Proxius* are now known from Florida.

A NEW SPECIES OF CALISIUS.

BY DR. E. BERGROTH, TURTOLA, FINLAND.

Calisius annulicomis, n. sp.

Ovatus (♀), fuscus, pronoto fusco-nigro, scutello subtestaceo, medio vittis duabus albis antrorsum leviter convergentibus, antice arcuato-conjunctis, postice extrorsum curvatis et latera attingentibus signato, inter has vittas et elevationem basalem nigram fusco-conspurcato, carina media nigra, medio late albo-interrupta, abdomine magna parte obscure rufescente, subtus latera versus parce albo-granulato, antennis fuscis, articulo tertio (ima basi excepta) flavo, articulo quarto nigro, pedibus sordide flavidis, femoribus (ima basi et summo apice exceptis) fuscis. Caput pronoto distincte brevius, antennis capiti subaeque longis, articulo secundo primo crassiore et paullo longiore, tertio secundo fere dimidio longiore, quarto tertio sat multo longiore et crassiore. Pronotum lateribus rectis, irregulariter nigro-spinulosis, medio vix sinuatis insigne, lobo postico carinis sex instructo, duabus mediis antrorsum leviter convergentibus, usque in lobum anticum extensis, carinis subsequentibus in parte basali levius, deinde fortiter convergentibus et usque ad apicem carinarum mediarum extensis, cum his angulum acutum formantibus, carinis extimis prope marginem lateralem sitis. Carina media scutelli granulata. Margo lateralis superior segmentorum connexivi granulis tribus perminutis, margo lateralis inferior granis tribus majoribus albis instructi. Long. ♀ 4 mm.

Tasmania (Launceston, J. J. Walker). Mus. Brit.

This remarkable species is by many characters very distinct from *C. interveniens* Bergr., the only Australian species hitherto known.

THE NORTH AMERICAN SPECIES OF THE GENERA
ARTHROPEAS AND ARTHROCERAS.

BY CHARLES W. JOHNSON, BOSTON, MASS.

The species *Arthropeas leptis* Osten Sacken seems to be the cause of some confusion in these two genera. This is probably due to the comparative scarcity of material, to an oversight in Aldrich's Catalogue, and to the fact that Osten Sacken in describing the species and referring to a number of minor characters wherein it differs from the typical *Arthropeas* failed to mention the most important feature—the absence of spurs on the anterior tibiae. This character, however, he mentions in 1882 (Berl. Ent. Zeits., XXVI, 365), as follows: "In the notes to my Catal. N. Am. Dipt., 1878 (p. 223), an insect is described which I referred provisionally to the genus *Arthropeas*. It has the body of a Leptid (*Symphoromyia*), with the antennae of a *Cenomyia*. It will probably form a new

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genus because, besides the differences in the venation noticed by me in the description, it has no spurs on the front tibiae, while such spurs are distinct in *Arthropeas siberica*."

In 1886 Dr. Williston erected the genus *Arthroceras* (Ent. Americana, II, 107), based chiefly on the character above mentioned with *A. pollinosum* (a new species), and *A. leptis* O. S. as the types. That *A. leptis* belonged to the genus *Arthroceras* was recognized by Coquillett in determining the species for Mrs. Slosson's list of Mt. Washington insects (Ent. News, VI, 6, 1895).

The two species may be separated by the following table:

Thorax unicolor, yellowish pollinose; halteres yellow. Colorado, Washington.....	<i>pollinosum</i> Will.
Thorax blackish, with two yellowish pollinose stripes; halteres brown. White Mts., N. H.....	<i>leptis</i> O. S.

Both species seem to be confined to the Canadian zone. The former I have received from Clear Creek, Col., May 20, 1891 (Osler); Happy Hollow and Little Beaver, Col., July 14 and 19 (Gillett). The latter has only been taken in New Hampshire, White Mts., "woods and alpine" (E. P. Austin); "Alpine region of Mt. Washington, at or above 5,500 ft." (Mrs. Slosson); "near summit," Mt. Washington, July 25, 1875 (Dr. Geo. Dimmock); Mt. Washington, July 7, 1909 (F. A. Sherriff); Base Station, Mt. Washington, July 30, 1912 (F. W. Dodge).

The species of the genus *Arthropeas* are likewise comparatively rare, and also seem to be confined to the Canadian zone. The species may be tabulated as follows:

Anal cell closed; wings distinctly banded; length, 8-9 mm.....	<i>americana</i> Loew.
Anal cell narrowly open; wings not banded; length, 12-14 mm.....	<i>magna</i> , n. sp.

Arthropeas americana Loew.

The following brief description is given, chiefly as a comparative one to Say's *Xylophagus fasciatus*:

Thorax black, covered with a yellowish pollen, leaving three wide black vittae; scutellum and metanotum black; abdomen yellow, basal half of the first to fourth segments black, the remaining segments yellow; halteres entirely yellow; legs yellow, outer half of the tarsi brown; apical third of the wing smoky black, base of the submarginal and first posterior, tip of the first basal, the entire discal and fourth posterior and outer portion of the fifth posterior cells whitish and forming a wide band across the centre of the wing; the greater portion of the first and second basal cells, base of the fifth posterior and tip of the anal cell and the anal angle smoky black; base of the wing and greater portion of the anal cell whitish. Length, 8.5 mm.

The following records constitute our present knowledge of its distribution: N. Wisconsin (Loew); Mass. (O. Sacken); Cheshire Harbor, near Mt. Graylock, Mass., June 30 (I. W. Beecroft); Lake Ganoga, North Mt., Pa., 2,300 ft., Aug. 29, 1897 (C. W. Johnson).

Xylophagus fasciatus Say.

"Wing dusky, fasciated; abdomen fasciated. Inhabits Indiana.

"Body dusky; thorax, *posterior portion honey-yellow; poisers blackish at tip*; wings dusky, a more distinct band on the middle and at the tip; feet honey-yellow; *hind tibiae blackish*; tergum yellow, basal half of the four basal segments black; *remaining segments nearly all black*. Length over two-fifths of an inch.

"By an accident the head and anterior part of the thorax of this fine specimen were destroyed, but the above description will sufficiently indicate the species. The wing nervures resemble those of the *maculatus* Fabr."

In the above description by Say, based on an imperfect specimen, I have italicized the parts showing discrepancies to Loew's species. The differences are too great to consider them the same; the description of the bands on the wings, "on the middle and at the tip," also does not agree with Say's usual accuracy. The locality, "Indiana," which is entirely in the upper Austral, would also indicate a different species. Say's reference to *maculatus*, which is a *Xylomyia* (= *Solva* Walk.), would indicate a closed fourth posterior cell.

Arthropeas magna, n. sp.

Arthropeas, n. sp.? Townsend.—Trans. Amer. Ent. Soc., XXII, 61, 1895.

♂.—Face blackish, covered with a dull yellowish pollen and pile, beard whitish, face with a deep Λ -shaped groove bordering the oral cavity, from which extends a deep groove between the antennae to the frontal triangle, ocelligerous tubercle black, palpi, proboscis and antennae yellow. Thorax black, thinly covered with hair (blackish on the dorsum and yellowish on the sides), through which show four dull yellow pollinose stripes, the lateral stripes broad, the middle one narrow, but expanding at the ends and connected at the humeri and post-alar callosities with the lateral stripes, the black areas between the stripes shining behind the suture; pleurae black, brownish pollinose; scutellum black. Abdomen black, middle and sides shining, first segment with a wide yellow, pollinose, posterior band, almost interrupted in the middle and expanding until it attains the full width of the segment at the lateral margins; second, third and fourth segments posteriorly margined with a yellow pollinose band, contracted in the middle and at the ends; on the second and third segments the bands are brown in the middle and at the ends, the remaining segments

yellowish pollinose; venter entirely yellow. Legs yellow, coxæ blackish, halteres yellow. Wings brownish, slightly darker in the middle and along the fifth longitudinal vein; veins and costal cells yellow, basal half of the marginal cell white, the greater portion of the first and second basal cells noticeably lighter than the rest of the wing. Length, 12 mm.

♀.—Face, front and occiput covered with a dense brown pollen, the front about one-fourth the total width of the head, with five grooves above the base of the antennæ, the four outer ones slightly diverging below, above fusing and deflecting towards the ocelli, the middle one obsoletely divided into three smaller ones below the ocelli. The thoracic stripes are more prominent and a brighter yellow than in the male; scutellum velvety-brown, with three transverse ridges. The abdomen is shining and brownish black, with the posterior pollinose bands on the first, second and third segments, broadly interrupted. Length, 14 mm.

Three specimens, Beulah, Manitoba, received from Mr. C. T. Brues. Holotype and allotype in the author's collection. Paratype in the Museum Comparative Zoology, Cambridge, Mass.; "Hill City, So. Dakota" (Townsend).

This interesting species has the thick heavy form of *Cænomyia*, but the generic characters are those of *Arthropeas*, except that the anal cell is narrowly open. It seems to more clearly show the relationship of the two genera than the other species.

TWO NEW CANADIAN BEES.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

Sphecodes hudsoni, n. sp.

♀. Length about 7 mm.; head and thorax black, legs dark rufo-fuscos, abdomen entirely clear yellowish-ferruginous; head broader than long, face very broad, thinly covered (including the clypeus) with fine pale hair; mandibles bidentate, the apical half dark chestnut-red, the inner tooth short and rounded, about 208μ from apex of mandible; process of labrum very broad, shallowly depressed or subemarginate in middle; only the first three points of the flagellum remain in the types, but they are dull ferruginous beneath; clypeus strongly punctured; front extremely, densely and minutely punctured in middle, not quite so densely at sides, the punctures are so small as to be hard to see with a hand lens; mesothorax brilliantly shining, with scattered punctures, the median sulcus well marked; pleura, beneath the wings, with a large shining raised area, the pleura below this with fine close rugæ; area of metathorax large, fully 320μ . long, with about 20 coarse rugæ, the lateral ones parallel, radiating, the middle ones

irregular, some branching, Y-like in form; regular dark rufous; wings dusky hyaline, distinctly reddish, stigma and nervures red-brown; second submarginal cell broad, receiving first recurrent nervure just beyond the beginning of its last third; legs thinly clothed with pale hair; abdomen almost entirely impunctate, quite broad; apical plate about 170μ broad.

Hab.—Hudson Bay. British Museum (44. 17). In Robertson's tables of *Sphecodes* this runs nearest to *S. minor*, which is a larger and evidently different species. In the table of Maine species it runs to the group of *S. dichrous*, to which it is not closely allied. In my table of allies of *dichrous* it runs to the very much larger *arroyanus*. Superficially it is much like *S. washingtoni* Ckll., but aside from other differences, the metathoracic area is much larger than in *washingtoni*. It is a much larger species than *S. cressoni*, and has a broader head. Among the species of the northwest, it falls nearest to *S. patruelis* Ckll. (formerly recorded in error as *minor*), but *patruelis* has the front more coarsely punctured, and area of metathorax with stronger, irregular (not radiating) rugæ. It is quite different from *S. sulcatulus* by the densely punctured front, etc. The specimen has been in the British Museum for 67 years.

I take this opportunity to record two other interesting specimens of *Sphecodes* belonging to the British Museum.

(1.) *Sphecodes falcifer* Patton. Colorado (Cockerell). A common species of the Eastern United States, but new to Colorado. comes from my old collection of 1887–1890. The material which went to the British Museum was mostly in papers, and nearly all came from Wet Mountain Valley. A statement of the exact locality was furnished for each lot, either in a letter or on the box, but unfortunately the data were only preserved when they accompanied the specimen itself, and all the rest were simply labelled "Colorado (Cockerell)". It is nearly certain that all the specimens labelled in this way were from Wet Mountain Valley.

(2.) *Sphecodes persimilis* Lovell & Cockerell. Trenton Falls, New York; from F. Smith's collection. The specimen (♀) has the junction of the first and second dorsal abdominal segments rather evidently depressed, to this extent slightly approaching *S. pecosensis*. F. Smith, who owned the specimen, died in 1879, but the species was not described until 1907.

Anthidium wallisi, n. sp.

♀. Length about 10 mm.; black with chrome yellow markings, those on face, consisting only of an oval spot on each side touching upper part of clypeus, paler yellow; a large yellow spot above each eye; mandibles, tegulæ and thorax wholly without yellow; antennæ black; pubescence dull white, on vertex shining

and yellowish; ventral scope shining cream-colour; wings strongly brownish; femora and tibiae black; front tibiae with a yellow subapical more or less cuneiform mark; middle tibiae with a yellow mark extending from before middle to apex; hind tibiae with a yellow band, interrupted not far from base; tarsi ferruginous, more or less blackened at base, their hair mainly ferruginous; hind basitarsi with a broad yellow band; no pulvilli; first abdominal segment with a diamond-shaped yellow mark at each extreme side; second segment with a larger mark on each side, deeply notched inwardly, and a pair of transverse, discal stripes; third segment with an interrupted band, broad at sides, broadly and deeply notched in front sublaterally; fourth like third; fifth with the notch less developed, and the interruption narrower; sixth with two large yellow patches.

Hab.—Peachland, British Columbia, August 9, 1909 (*J. B. Wallis*, a 64.)

This has nearly the face-markings of *A. porterae personulatum* Ckll., but *personulatum* is considerably larger, the spots at side of face are lower down, the abdominal markings are much paler, and the abdomen is not so densely punctured. I asked myself whether *A. wallisi* could possibly be a colour-variety of *A. tenuiflora* Ckll., but it differs as follows, aside from the colour-markings: eyes paler and lighter green; teeth at lower corners of clypeus larger, nearly equal (the outer one much smaller in *tenuiflora*); lateral tooth-like angles of sixth abdominal segment very prominent; broad depressed apical margins of abdominal segments excessively, minutely and densely punctured, not shining (shining and less densely punctured in *tenuiflora*).

PHENACOCCLUS BETHELI AGAIN.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

When recently describing *P. betheli* in THE CANADIAN ENTOMOLOGIST, I remarked that it was possibly a subspecies of *P. cockerelli* King. I was surprised, a few days ago, to receive from Mr. E. Bethel a quantity of *P. betheli* on branches of *Amelanchier*, collected by Mr. L. J. Hersey at Steamboat Springs, Colorado. This looked suspicious, as Steamboat Springs is the type locality of *P. cockerelli*. However, the new material is twice the size of *cockerelli*, and yet the legs are not merely relatively, but actually smaller, and the fourth antennal joint is very short as in the Grand Canon insect. The insects, on being boiled in caustic potash, stain it a deep wine red. The larva is light orange.

Although I transmitted the original *cockerelli* material to Mr. King, I did not study it. I have, however, studied abundant material, agreeing with King's description, found by Mr. L. C.

Bragg on wild plums at Boulder, Colorado. Without feeling altogether confident that *betheli* is a distinct species, it seems that it must be so regarded unless proof can be brought to the contrary.

A word may be added concerning the value of antennal measurements in the determination of Coccidæ. Those who have used the antennal formulæ have found them very unreliable, and I have long ago given them up. It does not follow, as some uncritically assume that antennal measurements are therefore useless. The best way is to measure the joints of several antennæ, and from the measurements plot a "curve." I do this by using semitransparent typewriter paper, through which I can see my lined standard sheet. The curves so made will, of course, vary, hardly any two antennæ being exactly alike; but except for abnormalities (pathological specimens), nearly every species gives quite different curves, while two species, very different in other respects, will give nearly the same curve. Some of the widely distributed species give curves almost too variable to be of much service, but in these cases it is possible that the material contains more than one thing. It is also probable that widely distributed forms, living on various plants, are strongly heterozygous, while native species, with uniform environment and more or less restricted distribution, are prevailingly homozygous. It would be worth while for someone to carefully investigate a number of species with this point in mind.

The names of the members of the Society in the group on Plate I. are as follows:

First row, reading from right to left.—J. D. Evans, Prof. W. Lochhead, Rev. T. W. Fyles, H. H. Lyman, Dr. E. M. Walker, Dr. C. Gordon Hewitt, G. Beaulieu, A. F. Winn, Rev. L. Marcotte.

Second row, reading from left to right.—L. Cæser, Dr. E. H. Blackader, Rev. J. B. Mignault, Rev. Brother Germain, H. F. Hudson, Arthur Gibson, J. M. Swaine, G. E. Sanders, Dr. R. Matheson.

Top row, reading from right to left.—A. G. Turney, J. D. Tothill, Prof. J. E. Howitt, A. W. Baker, J. A. Guignard, J. I. Beaulne.

CORRECTIONS.

Page 214, line 7, for *heyoniæ* read *bryoniæ*.

Page 214, line 15, for *pormiaries* read *primaries*.

Page 215, line 24, for *Keolexia* read *Neolexia*, and for *scyline* read *xyline*.

AN EARLY REFERENCE TO THE OCCURRENCE OF THE ARMY WORM IN PENNSYLVANIA, NEW YORK AND CANADA.

BY F. M. WEBSTER, WASHINGTON, D. C.

The year 1743 seems to have been the first of which we have what is generally accepted as undoubtable evidence of the occurrence of this pest in the United States in destructive numbers. This information has always been based solely upon a statement made by Chas. L. Flint in a report on the Climatology of New England,* and is as follows: In 1743 there were "millions of devouring worms in armies, threatening to cut off every green thing. Hay very scarce, £7 and £8 a load."

There, however, is another bit of evidence of this outbreak of the Army worm in the year 1743 that appears to have been entirely overlooked. This is contained in a small but somewhat rare volume, by John Bartram, printed in London, England, in 1751.†

Mr. Bartram, as he states, "set out from his house on Skuylkil River the 3rd day of July, 1743." Under date of July 16th, near the Indian town of Tohicon, situated between the east branch of the Susquehanna and the main river, he says: "Here I observed for the first time in this journey that the worms which had done much mischief in the several parts of our Province by destroying the grass and even corn for two summers, had done the same thing here, and had eaten off the blades of their maize and long white grass, so that the stems of both stood naked four-foot high; I saw some of the naked dark-coloured grubs half an inch long, the most of them were gone, yet I could perceive they were the same that had visited us two months before; they clear all the grass in their way in any meadow they get into, and seem to be periodical as the locusts and caterpillar, the latter of which I am afraid will do us a great deal of mischief next summer."

Under date of 28th of the same month, having reached Oswego, New York, Mr. Bartram makes this entry in his record: "This was a rainy, thundering warm day, and two deputies arrived from the Oneidas. News came that the worms had destroyed abundance of corn and grass in Canada."

*Second Annual Report of the Secretary of the Massachusetts Board of Agriculture, 1854 (printed in 1855), p. 36.

†Observations on the Inhabitants, Climate, Soil, Rivers, Productions, Animals, and other matters worthy of notice. Made by Mr. John Bartram in his travels from Pennsylvania to Onondago, Oswego and the Lake Ontario, in Canada, to which is annexed a curious account of the Cataracts at Niagara. By Mr. Peter Kalm, a Swedish gentleman who travelled there. London: Printed for J. Whiston and B. White, in Fleet Street, 1751.

ENTOMOLOGICAL SOCIETY OF ONTARIO.—ANNUAL MEETING.

The Forty-ninth Annual Meeting of the Entomological Society of Ontario was held on Tuesday and Wednesday, Nov., 19th. and 20th. During the day meetings, which were held at the Carnegie Library, the chair was occupied by the president, Dr. E. M. Walker, while the evening meeting, held at the Normal School, was opened by the Hon. Martin Burrell, Minister of Agriculture.

Among those present were the Rev. T. W. Fyles, Dr. C. G. Hewitt, Messrs. J. H. Grisdale, W. H. Harrington, A. Gibson, J. M. Swaine, F. W. L. Sladen, J. A. Guignard, J. I. Beaulne and Rev. Bro. Germain, Ottawa; Messrs. H. H. Lyman and A. F. Winn, Montreal; Prof. W. Lochhead, Macdonald College, Que.; Mr. J. D. Evans, Trenton; Prof. J. E. Howitt, Messrs. L. Cæsar and A. W. Baker, Guelph; Dr. R. Matheson, Truro, N. S.; Mr. A. G. Turney, Fredericton, N. B.; Rev. Father Marcotte, Sherbrooke, Que.; Rev. J. B. Mignault, St. Therese, Que., and Messrs. J. B. Tothill, G. Beaulieu, G. E. Sanders, W. A. Ross, H. F. Hudson, C. E. Petch, Field Officers of the Division of Entomology.

On Tuesday morning the members met at the Experimental Farm, where a pleasant hour was spent looking over the specimens exhibited by those present and in examining the fine collections belonging to the Division. A meeting of the Council took place at eleven o'clock at which the report of the proceedings of the Society during the past year was drawn up and various questions of interest to the Society were discussed. A committee was appointed to consider certain changes in the constitution of the Society, which were proposed at a recent meeting at Guelph. In view of the fact that next year will mark the event of the Society's fiftieth annual meeting, it was decided that a Jubilee meeting be held in honour of the occasion, to which delegates from other Societies be invited and that this meeting be held at Guelph, about the beginning of September, the exact date to be decided upon later. A special committee was appointed to take charge of the arrangements in connection with the meeting.

In the afternoon the Society met at the Carnegie Library, the proceedings commencing with the reading of the reports of the various officers of the society, including those of three of the directors on the insects of the year in their respective districts, viz., Messrs A. Gibson, Ottawa; A. Cosens, Toronto; and W. A. Ross, Jordan Harbour. These were followed by the reports of the Montreal, Toronto and British Columbia branches.

The Annual Address was then delivered by the president, Dr. Walker, the subject being "Faunal Zones of Canada."

Dr. Hewitt then gave an interesting "Review of Canadian Entomology for 1912" in which he outlined the work of the division for the year, illustrating the valuable results that have already followed the establishment of field stations in various parts of the country. Prof. Lochhead next addressed the meeting on "The Teaching of Entomology in the Agricultural Colleges", a subject which evoked much interesting discussion. A particularly enjoyable feature of the meeting was the next paper, "The Rise in Public Estimation of the Science of Entomology", by the Rev. Dr. Fyles, whose charming style and dramatic delivery were once again the delight of all the members present.

At the evening meeting, which was held in the Auditorium of the Normal School, the chair was occupied by the Hon. Martin Burrell, Minister of Agriculture, who in a highly entertaining address, introduced the lecturer, Mr. F. W. L. Sladen, of the Division of Entomology. Mr. Sladen, who is a leading authority on apiculture, gave a very interesting and instructive lecture on "Bumble-bees and their Ways," which was illustrated by a number of beautiful lantern slides.

A special feature of the Wednesday meeting was an entertaining address by Mr. J. H. Grisdale, Director of the Dominion Experimental Farms, in which a keen appreciation was shown of the work that is now being done in Canada in economic entomology.

During the meeting the following papers were read; "The Chinch Bug in Ontario," by Mr. H. F. Hudson; "The Importation and Establishment of Predaceous Enemies of the Brown-tail Moth in New Brunswick," by Mr. J. D. Tothill; "The Discovery of the San José Scale in Nova Scotia," by Mr. G. E. Sanders; "Observations on the Effect of Climatic Conditions on the Brown-tail Moth in Canada," by Messrs Tothill and Sanders; "Observations on the Apple Maggot in Ontario in 1912," by Mr. W. A. Ross; "Notes on Injurious Orchard Insects in Quebec in 1912," by Mr. C. E. Petch; "Insects of the Season in Ontario," by Mr. L. Cæsar; "Injurious Insects in Quebec for the year 1912," by Prof. W. Lochhead; "Forest Insects in Canada in 1912," by Mr. J. M. Swaine; "The Elater Beetles," by Mr. G. Beaulieu; "Aquatic Insects," by Dr. R. Matheson; "The Entomological Record for 1912," and "Flea Beetles and their Control," by Mr. A. Gibson; "Insect Pests of Southern Manitoba during 1912," by Mr. Norman Criddle; "Some New and Unrecorded Ontario Fruit Pests" and "Arsenite of Zinc as a Substitute for Arsenate of Lead," by Mr. L. Cæsar.

The election of officers for the ensuing year resulted as follows:

President:—Rev. C. J. S. Bethune, M. A., D. C. L., F. R. S. C., Professor of Entomology and Zoology, O. A. Callege, Guelph.

Vice-president.—Dr. C. Gordon Hewitt, Dominion Entomologist, Central Experimental Farm, Ottawa.

Secretary-Treasurer.—Mr. A. W. Baker, B. S. A., Demonstrator in Entomology, O. A. College, Guelph.

Curator.—Mr G. J. Spencer, Assistant in Entomology, O. A. College.

Librarian.—Rev. C. J. S. Bethune.

Directors.—Division No. 1, Mr. Arthur Gibson, Div. of Entomology, Central Experimental Farm, Ottawa; Division No. 2, Mr. C. E. Grant, Orillia; Division No. 3, Mr. A. Cosens, Parkdale Collegiate Institute, Toronto; Division No. 4, Mr. C. W. Nash, East Toronto; Division No. 5, Mr. F. J. A. Morris, Port Hope; Division No. 6, Mr. R. S. Hamilton, Collegiate Institute, Galt; Division No. 7, Mr. W. A. Ross, Jordan Harbour.

Delegate to Royal Society.—Mr. A. F. Winn, Montreal.

Auditors.—Messrs J. E. Howitt and L. Caesar, O. A. College.

DESCRIPTION OF TWO NEW SPECIES OF ORTHOPTERA FROM PERU.

BY A. N. CAUDELL.

Bureau of Entomology, U. S. Dept. Agriculture, Washington, D. C.

Among Orthoptera recently received from C. H. T. Townsend, Piura, Peru, for determination were the following two species which seem to be undescribed.

Plectoptera huascaray, n. sp.

Description.—♂ (the ♀ unknown): Most closely allied to the *P. micans* of Bolivar from the West Indies but is decidedly larger. Is also allied to *P. picta* S. and Z. but has darker elytra and wings and the pronotal disk is not margined in front.

General colour black variegated with brown. Head black with a small ashy variegation and transverse stripe about the insertion of the antennæ; antennæ black, the first few segments lighter. Pronotal disk broadly elliptical, black in colour with the lateral margins broadly and the posterior margin very narrowly and interruptedly bordered with yellow. Elytra brown and black, the humeral area and a large subquadrate spot at about the apical third of the posterior margin black, the rest yellowish brown flecked with black, the black flecks assuming a definite elongate shape and regular arrangement along the posterior half of the costal margin. Wings large, smoky brown, the apical area nearly black, the costal margin almost entirely so; the apical area is very large, being nearly as long as the rest of the wing, and the base is straight, not at all angulate. Abdomen black; supra-anal plate twice as broad as long, mesially produced apically and narrowly

rounded; subgenital plate asymmetrical, diagonally incised apically and furnished with short style-like organs; cerci short and stout, widest beyond the middle. The legs are black with a pre-apical yellowish band on the tibiae and the base of the basal segment of the tarsi also lighter.

Measurements. Total length from front of pronotum to the tip of the elytra, 7 mm.; of elytra 5.5 mm.; of wing, 10 mm.

Type a single ♂, Huascaray, Peru, September 21, 1911, altitude 6500 feet. C. H. T. Townsend collector. Catalogue No 15321 U. S. Nat. Museum.

Cocconotus charape, n. sp.

Description.—♂ (the ♀ unknown): Allied to *C. pulcher* Brunn. and runs to that species in the tables in Brunner's Monograph of the Pseudophilinae. It differs, however, very distinctly from that species.

In size and general coloration agreeing fairly well with *pulcher*. Head black and yellowish, the occiput blackish shading into yellowish on the cheeks and continuing yellowish down to the mouth-parts; mandibles, labrum and base of the clypeus and the sides of the face piceous, front of the face dark reddish brown with an apically pitted tubercle in the centre; on each side and just above the ends of the clypeal suture the face bears a large erect piceous pointed tubercle about as long as the clypeus; antennae piceous basally, shading gradually to reddish brown. Pronotum without carinae, the shoulders only slightly squared; disk slightly rugose, truncate behind, gently rounded before, the main transverse sulcus profound and situated distinctly behind the middle; prosternal spines long, sharp and piceous, the rest of the lower surface of the thorax light yellowish; the disk and the lateral lobes of the pronotum margined with piceous and the central portion of the disk, especially anterior of the principal sulcus, light yellowish brown, which colour continues down diagonally forwards entirely across the lateral lobes. Legs stout and yellowish, the coxae, the geniculations and the dorsal surface of the anterior tibiae more or less infuscated; fore tibiae furnished with conchate foramina and armed above on the inner margin with four tubercular swellings and armed beneath with a double row of spines; fore femora less than one and one half times as long as the pronotum, smooth above but armed beneath on the front margin with three short black spines; middle legs similar to the front ones but the tibiae have three distinct spinules above; hind femora very stout and short, the greatest width about three and one half times the length, smooth above, beneath armed on the outer side with seven or eight stout spines and on the inner margin with a smaller number of smaller spines, all the spines piceous to the base; hind tibiae

slightly curved, armed above and beneath on both margins with piceous spines, those beneath smaller and placed more remote from each other. Elytra fully developed, surpassing the tip of the abdomen, the anterior half greenish, the posterior half brownish; tympanum small, that of the left elytron the smaller and margined with piceous; wings about as broad as long and very gently infumate, when folded just reaching the tip of the elytra. Abdomen moderately plump, dark brownish, apically growing lighter; supra-anal plate small, vertical apically, obtusangularly rounded, entire; subgenital plate moderately elongate, truncate apically and furnished with a pair of elongate club-shaped apical styles, black in colour; cerci short, stout and apically cut squarely off, the tip slightly excavate and armed dorsally with a subapical tubercle.

Measurements. Entire length of body from the front of the head to the tips of the subgenital stylets, 33 mm.; pronotum, 7 mm.; elytra, 26 mm.; wings, 23 mm.; fore femora, 10 mm.; hind femora, 20 mm.; width of hind femora at the widest part, 6 mm.; of elytra at widest point, 7 mm.; three millimeters from the tip, 3 mm.; of wings at widest point, 21 mm.

Type a single ♂. Rio Charape, Peru, September 17, 1911. C. H. T. Townsend, collector. Catalogue No. 15320 U. S. Nat. Museum.

ON SOME APPARENTLY NEW COLEOPTERA FROM INDIANA AND FLORIDA.

BY W. S. BLATCHLEY, INDIANAPOLIS, INDIANA.

On of the most common of the Chrysomelid beetles taken in Florida in February and March was *Lema brunnicollis* Lac., which was abundant on the flowers and foliage of the thistle *Carduus horridulus* Push. The first blossom of this thistle opened near Sarasota on February 6th, and the first *Lema* was taken on the 8th. They were found mating on February 16th. and again at Sanford on March 28th.

A careful comparison of these Florida specimens with those from Indiana described under the name *brunnicollis* Lac. in my "Coleoptera of Indiana", p. 1111, shows that the two are very distinct, the Florida example being much larger, with less convex elytra and having the frontal tubercles less prominent, the thorax less constricted at base, with two rows of coarse punctures along the median line and with numerous similar punctures scattered over the apical half. In colour the Florida specimens are darker, the elytra being blackish blue and the thorax in most specimens having the apical half clouded with greenish fuscous. These differences were pointed out to the late Frederick Blanchard,

January, 1913

of Tyngsboro, Massachusetts, and to Frederic Knab, of Washington, D. C., both of whom agreed with me that the southern species was undoubtedly the one described as *brunnicolis* by Lacordaire, although Mr. Blanchard wrote that examples of the form described from Indiana had been in his collection for many years under that name. The northern form is apparently unnamed and is herewith described more in detail as follows:

Lema palustris sp. nov.

Elongate-oblong. Head, thorax, scutellum and under surface, except abdomen, dull red; antennæ, legs and abdomen black; elytra bright greenish blue. Head very finely and sparsely punctate, the front with a strong bilobed tubercle. Antennæ with joints 1 to 4 subequal, the others longer and gradually stouter. Thorax as long as wide, finely and very sparsely punctate, with a single row of 5 or 6 coarser punctures along the median line; sides constricted behind the middle. Elytra impressed on the inner side of humeral angles, each with 10 rows of rather coarse, scarcely impressed punctures; intervals wholly smooth; abdomen distinctly but rather sparsely punctate. Length 4-4.5 mm.

In Indiana the species here described has been taken by sweeping herbage only in the tamarack swamps of the northern third of the State, hence the specific name given. It is probably a member of the Alleghanian fauna. The principal differences between it and the southern form, believed to be the true *brunnicolis*, have been given above. The length of the latter is 5-5.5 mm., and the body is proportionally much stouter. From the description of *L. coloradensis* Linell, *palustris* differs in having the antennæ and legs wholly black and in the abdomen being distinctly punctate.

Chlamys nodulosa, sp. nov.

Subquadrate, robust. Uniform dark brownish bronze. Antennæ paler at base, serrate from the fifth joint, the third and fourth joints subequal. Eyes large, reniform, deeply emarginate on the inner side, separated by an interval less than their longer diameter. Front with a number of fine scattered punctures. Thorax without trace of strigæ, the central gibbosity large, its crest with a pair of tubercles, its anterior face with four interrupted carinæ, each pair confluent at apex; a prominent tubercle each side one-third from apex and near the outer of these carinæ, and another, semi-obsolete, midway between this and the side of thorax, the intervals between the carinæ and tubercles deeply, coarsely but not densely punctate. Elytra each with about 9 prominent tubercles, the intervals between these with coarse punctures. Pygidium coarsely and sparsely punctate and with three short carinæ extending from a median gibbosity nearly to the posterior border. Under

surface, especially the meso- and meta-episterna, very coarsely, densely and shallowly punctate. Length 4-4.5 mm.

Described from 10 specimens beaten from scrub-oak near Arch Creek, Sanford and Ormond, Florida. March 12th.-April 3rd. A pair of the cotypes are in the collection of Fredric Knab, and another in that of the late Mr. Blanchard.

This is a smaller species than *C. plicata*, very different in the sculpture of thorax and elytra and in the narrower separation of the eyes. It is more subquadrate and robust than *Exema gibber* Oliv. and has also a wholly different sculpture from that species, the tubercle being more pointed and prominent and the punctures more rounded, distinct and deeper. The character usually given as separating the genera *Chlamys* and *Exema* is very slight and more or less variable, and it is my opinion that the latter genus should be abandoned, *Chlamys* having the priority.

Cryptocephalus sanfordi, sp. nov.

Short, robust, subcylindrical. Head, thorax, scutellum, legs and under surface reddish yellow; elytra straw-yellow, the basal fourth of second interval, the entire fourth interval except a small oval spot at apical fourth, and three oblong spots on sixth interval shining black; joints 6-11 of antennæ fuscous. Front of head with a few minute scattered punctures. Thorax wholly without punctures. Elytra with six entire punctured dorsal striae, the sutural stria represented by only 3 to 4 punctures, the first dorsal forking at the middle and therefore double on basal half, the fourth and fifth striae sinuous and approaching in the black spaces; alternate intervals wider and wholly pale. Abdomen minutely and sparsely punctate, each puncture bearing a fine prostrate hair; fifth ventral deeply concave at middle. Length 3.5-4mm.

Described from 2 specimens beaten from willow near Sanford, Florida, March 25th.-27th., 1901.

Brachys cuprascens, sp. nov.

Ovate, shorter and stouter than *B. ovata* Web. Dark bronze, thickly clothed above with short coppery-red and whitish hairs, those on elytra arranged in three irregular very sinuous cross-bands composed mainly of the reddish hairs, but bordered anteriorly with the whitish ones. Head and thorax as in *B. ovata*, the median groove of the former narrower and less prominent. Rows of elytral punctures much coarser and more distinct and regular than in *ovata*, those of the interval next to the marginal carina so arranged as to give the appearance of ribs or plicæ beneath the vestiture. Shallow punctures of the under surface much less evident than in *ovata*. Last ventral of female more deeply emarginate, or impressed, and with the fimbriate hairs

much more dense than in *ovata*: last ventral of male small, its hind border in both sexes finely pectinate. Length 4.5–5.2 mm.

Nine specimens beaten from the flowers of the farkle-berry, *Vaccinium arboreum* Marsh., near Sanford and Ormond, March 29th.—April 6th. Easily told at a glance from *ovata* by the much more dense and coppery vestiture. Mr. Blanchard wrote me that he had had it separated but not named in his collection for more than 40 years.

Hallomenus fuscotuturalis, sp. nov.

Elongate-oblong. Dull brownish yellow, sparsely clothed with fine prostrate yellowish hairs; elytra with a common sutural fuscopiceous stripe which is widest in the region of the scutellum, the margins also often darker than the disk. Head finely and evenly punctate; eyes small, deeply emarginate on the inner side; antennæ with second joint one-half the length of third, joints 3–11 subequal and one-half longer than wide instead of subquadrate as in the other species of the genus except *serricornis*. Thorax at base one-half wider than long, sides gradually rounded to apex which is one-third narrower than base; disk finely and densely punctate, the basal impressions feeble. Elytra as wide at base as thorax, sides parallel for three-fifths their length, thence gradually converging to the rounded apex; their surface, as well as that of abdomen, very finely and much less closely punctate than thorax. Length 3 mm.

Six specimens beaten from scrub-oak and willow near Sanford. March 28–29, 1911.

NEWFOUNDLAND LEPIDOPTERA.—In a little box of insects collected at St. Anthony's during the summer of 1910, were specimens of *Argynnis freija* Thunb.; *A. myrina* Cran.; *Colias pelidne* Bdv.; *Coenonympha inornata* Edw.; *Apantes virguncula* Kirby; *Aplectoides livalis* Smith; *Anarta cocklet* Dyar; *Mamestra sutrina* Grote; *Autographa alia* Oltol.; *Epirrita dilutata* D. & S.; *Epelis truncataria* Walk.; *Pyrausta inaequalis* Guen.; *Crambus unistriatellus* Pack.

A. F. WINN, Westmount.

Lycaena comyntas Godt.—While collecting Geometridæ after sundown at Valcour, N. Y., July 25th., I found a male *L. comyntas* asleep on a blade of grass. Like many other "Blues," it rests for the night head downwards, the tails of the hind-wings and the black spot strongly resembling a pair of antennæ and an eye at the wrong end. A second specimen was found in the same attitude after a few minutes' search.

A. F. WINN, Westmount.

GEOMETRID NOTES—DESCRIPTION OF A NEW EOIS.

BY L. M. SWETT, BOSTON, MASS.

Eois brauneata, n. sp.

Expanse 13 mm; palpi quite long, blackish; head light ash gray at base of antennæ, darker beyond. Thorax and abdomen light ash gray. Fore wings long lanceolate, light gray shaded with brown. Five black dots on costa, from the first basally runs a black hair-line irregularly across the wing showing strongly on the veins as dots. Above the black discal dot there is a spot on the costa; from the discal dot to inner margin there runs a black line. There is a narrow pointed brown band which runs just outside of discal dot and extends toward tip of forewing as it runs beyond discal spot. Beyond this narrow band which resembles slightly the band of *Leptomeris occidentaria* Pack., only much narrower, there is a wide light ash space. Outer margin with a broad brown band crossing to inner margin, through the middle of which runs a zig-zag white line. Venular dots at base of long brown fringe. Hind wings grayish brown with an irregular, broad fuscous band crossing as two zig-zag lines on each side of the discal spot. This band appears to be projected outwardly on the veins. There is a marginal irregular black line. The fringe is long and brownish gray in colour. Beneath fore wings reddish brown, especially near apex of wing. There is a trace of the fuscous band crossing wing at discal spot, which is apparently in the middle of it. The costa has dots of black and yellow at intervals from base to tip. Hind wings lighter coloured than fore wings. Fuscous band at discal spot showing through faintly and bent toward opposite spot; rest of wing beyond light ash.

This delicate little Geometer may be known by the peculiar band across the fore and hind wings and by the ash colour shaded with brown. I take pleasure in naming this species after Miss Braun.

Type.—1 ♀, May 20, 1906, Cincinnati, Ohio; from Miss A. F. Braun; in my collection.

GEOMETRID NOTES.—A NEW DIASTICTIS HÜB.

BY L. W. SWETT, BOSTON, MASS.

Diastictis anataria, n. sp.

Expanse, 24 to 30 mm; palpi, 1 mm, grayish; head light gray at base of antennæ; thorax and abdomen light ashen gray. Fore wings light ash with a bluish tinge; there are four distinct costal patches of rusty brown, the outer being the largest. From each of the costal patches pale rust-coloured bands run sinuately to inner margin and at the outer margin is a broad reddish brown

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patch extending almost to inner margin. The first costal patch is linear and points towards first venular dots of outer margin; a pale rust-red line runs from this patch almost to inner margin. The second costal patch is not as strongly angulated on costa as the first. A line runs from it to vein 3 in a straight line just inside the black linear discal dot, and then curves backward towards body to inner margin. The third costal patch is smaller than the others but has a pale line running from it to inner margin, bending outwards in a curve opposite discal line to the middle of vein 2, then going straight to inner margin. The fourth costal patch is very large, $1\frac{1}{2}$ mm wide and 2 mm long; it seems to have a notch near the bottom on the outer side and from the base of this runs a pale rust-red line to inner margin straighter than the other lines. The apex of the fore wing is light bluish ash, and near the base of the fourth costal spot is the broad reddish-brown band, widening as it approaches inner margin, being more distinct in some specimens than others, as are also the costal lines, which hardly show in one specimen. The fore wings are finely powdered with red-brown strigæ and have black venular dots on outer margin. The hind wings have traces of two pale brown lines beyond discal spot, but this may be an arrangement of strigæ as it shows in only one specimen. The general colour is lighter ash with a yellowish tinge and the venular dots are the same as on fore wings. Beneath the wings are densely strigate, the lines of fore wings showing through very faintly from the second and third costal patches on each side of discal spot. Beneath third and fourth patches of fore wings the costa is bright orange, and the apex has brown cloudings. The hind wings are densely strigated also and there are two pale red brown lines crossing wing beyond discal spot. The veins are ochreous and the dots are between, at base of fringe.

Type,—1 ♂, August 8, 1909. Half Way House, Mt. Washington, N. H.; taken at light by myself.

Cotypes—2 ♂s, July 27, August 11, 1909, N. E. Harbor, Maine; taken by Dr. Charles S. Minot, in Boston Society of Natural History collection. This species resembles *M. praeatomata* very slightly.

We owe our readers an explanation of the extremely late appearance of our December number. Part of the proofs went astray in the mails and the discovery was not made until after a considerable loss of time. This is the more regrettable as it has resulted in the delay of the January number also.

BOOK NOTICES.

The Large Larch Sawfly; with an account of its parasites, other natural enemies and means of control. By C. Gordon Hewitt. D. Sc. (Bulletin No. 10.—Second Series, Entomological Bulletin No. 5. Division of Entomology, Dept. Agriculture, Ottawa.)

It was a fortunate circumstance that when Dr. Hewitt came to Canada three years ago, he was already intimately acquainted with our most injurious Canadian forest insect, the Larch Sawfly (*Nematus erichsonii* Hartig), this species being apparently a native of Europe and more or less destructive there also. Dr. Hewitt had already spent three years in the investigation of the life history and economics of this insect in England and having thereby determined the means by which its ravages can be checked in its native country he was particularly well fitted to grapple with the more difficult problem of its control in the vast larch or tamarack districts of North America.

Since coming to Canada Dr. Hewitt's studies of the Larch Sawfly have been continued and the results of these and the earlier investigations are embodied in the present report, in which a detailed account is given of the life-history, parasites and other natural enemies of this insect in both Europe and North America and the means by which it can be controlled.

The artificial means of control which have proved useful in the English larch plantations are, of course, impracticable in the vast forests of Canada and we must therefore rely altogether upon the parasites and other enemies. These are, however, not potent enough in North America to check the extensive outbreaks of the sawfly, which have several times occurred in this country, until most of the trees of the affected region have been killed by repeated defoliation. Dr. Hewitt has accordingly been engaged in the importation of sawfly cocoons from England, where this species is largely controlled by an ichneumon fly, *Mesoleius tenthredinis* Morley, and has succeeded in rearing from the cocoons a considerable number of these useful parasites and liberating them in various parts of Canada where the Larch Sawfly is prevalent. There is thus much reason to hope that the *Mesoleius* will become established here and in time increase in numbers to such an extent as to materially aid the other natural enemies of the saw-fly, and perhaps entirely prevent the occurrence of such serious outbreaks as that which we have been experiencing in Canada of late years.

Among the noteworthy facts which have been brought to light in this study are the following: There are four or five ecdyses during the larval feeding period and another ecdysis within the cocoon, whereas according to Packard, whose statements have been followed in all subsequent accounts, there are only three moults. The period from the time of hatching to the spinning of the cocoon is about 16 to 21 days in Canada, which is about twice as long as given by Packard.

The habits of the Field Vole (*Microtis agrestis*), in England of extracting the larvae from the cocoons and feeding on them is paralleled in North America, as observed by Dr. A. N. Fisher of the United States Biological Survey, by the Deer-mouse (*Peromyscus maniculatus artemisiae*). Both of these rodents are normally phytophagous. Insectivorous birds are also an important aid in the control of the Larch Sawfly and their protection and encouragement is strongly recommended.

The bulletin is illustrated by an excellent coloured plate showing the adult and larva of *N. erichsonii*, the effect of its oviposition in the terminal shoot of the larch, and two of its most important parasites, the ichneumon fly, *M. tenthredinis*, and the fungus, *Isospora farinosa*, which attacks the larva within the cocoon. There are also a number of excellent drawings and half-tones from photographs.

Copies of this bulletin may be obtained from the Division of Entomology, Central Experimental Farm, Ottawa.

A Preliminary List of the Insects of the Province of Quebec. Part I, Lepidoptera, by A. F. Winn.

This is a most important contribution to our knowledge of the distribution of Canadian insects. The list embraces nearly 1,300 species and is modelled upon the last edition (1909) of Smith's Insects of New Jersey. It is published as an appendix to the Annual Report of the Quebec Society for the Protection of Plants.

Brief diagnoses of each family are given and under each species is a full list of localities, dates of capture and names of collectors. There are also annotated lists of the collectors whose records have been included and of the localities referred to. A few of the commoner species are illustrated.

Mailed January 22nd, 1913.

